

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
 US Department of Commerce  
 United States Patent and Trademark  
 Office, PCT  
 2011 South Clark Place Room  
 CP2/5C24  
 Arlington, VA 22202  
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

<b>Date of mailing</b> (day/month/year) 01 December 2000 (01.12.00)	
<b>International application No.</b> PCT/GB00/01249	<b>Applicant's or agent's file reference</b> JEB/MPC/4905
<b>International filing date</b> (day/month/year) 31 March 2000 (31.03.00)	<b>Priority date</b> (day/month/year) 01 April 1999 (01.04.99)
<b>Applicant</b> RUSSELL, Philip, St.John et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

25 October 2000 (25.10.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	<b>Authorized officer</b>  R. Chrem Telephone No.: (41-22) 338.83.38
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Copy for the Elected Office (EO/US)

PCT/GB00/01249

## PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

To:

BOWDERY, A., O.  
Qinetiq Limited  
IP Formalities  
A4 Bldg., Cody Technology Park  
Ively Road, Farnborough  
Hampshire GU14 0LX  
ROYAUME-UNI

Date of mailing (day/month/year) 05 November 2001 (05.11.01)	<b>IMPORTANT NOTIFICATION</b>
Applicant's or agent's file reference JEB/MPC/4905	
International application No. PCT/GB00/01249	International filing date (day/month/year) 31 March 2000 (31.03.00)

1. The following indications appeared on record concerning:		
<input checked="" type="checkbox"/> the applicant	<input type="checkbox"/> the inventor	<input type="checkbox"/> the agent <input type="checkbox"/> the common representative
Name and Address THE SECRETARY OF STATE FOR DEFENCE Whitehall London SW1 United Kingdom	State of Nationality GB	State of Residence GB
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:		
<input checked="" type="checkbox"/> the person	<input type="checkbox"/> the name	<input type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence
Name and Address QINETIQ LIMITED 85 Buckingham Gate London SW1 6TD United Kingdom	State of Nationality GB	State of Residence GB
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
3. Further observations, if necessary:		
4. A copy of this notification has been sent to:		
<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned	
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned	
<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:	

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer  R. Chrem
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>JEB/MPC/4905</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 00/ 01249</b>	International filing date (day/month/year) <b>31/03/2000</b>	(Earliest) Priority Date (day/month/year) <b>01/04/1999</b>
Applicant  <b>THE SECRETARY OF STATE FOR DEFENCE</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1  
☐ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/01249

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 7 G02B6/12

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G02B C03B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

INSPEC, EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 802 236 A (DIGIOVANNI DAVID JOHN ET AL) 1 September 1998 (1998-09-01)	1-7, 10-19, 28-30
A	abstract; figures  column 1, line 46 -column 2, line 9 column 3, line 24 - line 33 column 5, line 38 -column 6, line 65 column 10, line 45 -column 11, line 5 ---	8,9, 20-27
P,X	WO 99 64903 A (BARKOU STIG EIGIL ;BJARKLEV ANDERS OVERGAARD (DK); BROENG JES (DK)) 16 December 1999 (1999-12-16) abstract; figure 4 --- -/--	20-22, 24,25,27

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

18 July 2000

Date of mailing of the international search report

25/07/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
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Authorized officer

Faderl, I

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/01249

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	BARKOU S E ET AL: "SILICA-AIR PHOTONIC CRYSTAL FIBER DESIGN THAT PERMITS WAVEGUIDING BY A TRUE PHOTONIC BANDGAP EFFECT" OPTICS LETTERS,US,OPTICAL SOCIETY OF AMERICA, WASHINGTON, vol. 24, no. 1, 1999, pages 46-48, XP000801368 ISSN: 0146-9592 the whole document ---	1-11
A	BROENG J ET AL: "Highly increased photonic band gaps in silica/air structures" OPTICS COMMUNICATIONS,NL,NORTH-HOLLAND PUBLISHING CO. AMSTERDAM, vol. 156, no. 4-6, 15 November 1998 (1998-11-15), pages 240-244, XP004143066 ISSN: 0030-4018 the whole document ---	1-11
A	EP 0 783 784 A (BRITISH TELECOMM) 16 July 1997 (1997-07-16) & US 5 881 200 A (BRITISH TELECOMM) 9 March 1999 (1999-03-09) the whole document ---	9,14,15
A	LIN S -Y ET AL: "HIGH-Q PHOTONIC BANDGAP RESONANT CAVITIES: FROM MM-WAVE TO OPTICAL REGIME" PROCEEDINGS OF THE SPIE,US,SPIE, BELLINGHAM, VA, vol. 2693, 1996, pages 170-175, XP000671668 the whole document -----	1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/01249


Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5802236 A	01-09-1998	EP 0810453 A JP 10095628 A	03-12-1997 14-04-1998
W0 9964903 A	16-12-1999	AU 3026099 A AU 3810699 A W0 9964904 A	30-12-1999 30-12-1999 16-12-1999
EP 0783784 A	16-07-1997	CA 2199506 A W0 9610282 A JP 10506502 T US 5881200 A	04-04-1996 04-04-1996 23-06-1998 09-03-1999

REC'D 17 MAY 2001

WIPO PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 4905 WO JEB/MPC	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/01249	International filing date (day/month/year) 31/03/2000	Priority date (day/month/year) 01/04/1999
International Patent Classification (IPC) or national classification and IPC G02B6/12		
Applicant THE SECRETARY OF STATE FOR DEFENCE		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"><li>I <input checked="" type="checkbox"/> Basis of the report</li><li>II <input type="checkbox"/> Priority</li><li>III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li><li>IV <input type="checkbox"/> Lack of unity of invention</li><li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li><li>VI <input checked="" type="checkbox"/> Certain documents cited</li><li>VII <input checked="" type="checkbox"/> Certain defects in the international application</li><li>VIII <input checked="" type="checkbox"/> Certain observations on the international application</li></ul>		
Date of submission of the demand  25/10/2000	Date of completion of this report  15.05.2001	
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Gaukel, G  Telephone No. +49 89 2399 2752	



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01249

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

### Description, pages:

1-18 as originally filed

### Claims, No.:

1-30 as originally filed

### Drawings, sheets:

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01249

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 21, 27 to 30.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 21, 27 to 30 are so unclear that no meaningful opinion could be formed (*specify*):  
**see separate sheet**

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 7,20,22-26

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01249

	No:	Claims	1-6,8,10-15,17-19
Inventive step (IS)	Yes:	Claims	
	No:	Claims	7, 16, 20, 22-26
Industrial applicability (IA)	Yes:	Claims	1-20,22-26
	No:	Claims	

2. Citations and explanations  
**see separate sheet**

## VI. Certain documents cited

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

**see separate sheet**

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/GB00/01249

Concerning **section III**:

Claim 21 is completely void of any structural feature and thus cannot be regarded as sufficiently clear to be examined.

Claim 27 is a "product-by-process" claim not referring to any structural features and thus, cannot be regarded as a sufficiently clear definition of a fibre.

Claims 28 and 29 are omnibus claims referring to drawings and thus not defining positive features.

Claim 30 refers in a general way to a method, however, lacks any method step.

The intended scope of the above claims are thus left completely obscure.

Concerning **section V**:

1. The following documents are cited:

D1: WO 9900685 A

D2: BARKOU S E ET AL: 'SILICA-AIR PHOTONIC CRYSTAL FIBER DESIGN THAT PERMITS WAVEGUIDING BY A TRUE PHOTONIC BANDGAP EFFECT' OPTICS LETTERS,US,OPTICAL SOCIETY OF AMERICA, WASHINGTON, vol. 24, no. 1, 1999, pages 46-48

2. D1 discloses (see abstract, claims 1 to 31, p.5, 3rd to 5th para., p.6, 1st para., p.11, 2nd and 3rd para., p.12, 1st para., p.13, 1st para.,p.17., last para., p.18, 2nd and 3rd para.) a photonic crystal fibre comprising a core = region of lower refractive index which is substantially surrounded by a cladding which includes holes arranged in a substantially periodically way, i.e. hexagonal (see claims 3 and 18 of D1). The core region is circular and should exceed 5  $\mu\text{m}$  and may have a diameter of at least 20  $\mu\text{m}$ . Thus, the longest transverse dimension of the core (=section of lower refractive index) is longer than the single, shortest period of the cladding, i.e. the pitch (see section VIII). As regards the definition of the cladding index as being "not less than that of the core", it is observed that this is understood as synonymous to "equal or greater" and therefore, the feature "the core region has a smaller or lower refractive index than the cladding" appears to be disclosed by D1. (Art.33.2 PCT).

However, even when challenging this fact, the selection of a low index core region appears to be a selection which would not involve an inventive step (see also D2, abstract, references to central air hole forming a "lower index region"). Moreover, D2 already teaches that the diameter of the central hole may be tailored according to needs (p.47, right col.).

As regards dependent claims 2 to 6, 8 and 9 are also found in D1 (see passages already cited, low pressure region is identified with vacuum as set out in claim 12 of D1).

As regards claim 7, as already set out above, the use of central holes as cores is known from D1 and thus cannot involve an inventive step.

As regards independent claim 10 and dependent claim 11, the same objection as set out with respect to claim 1 applies (see also section VIII).

As regards claims 12 to 15, 17 to 19, these claims define devices or systems including the photonic fibre according to the previous claims, however, D1 already refers to the defined types of use (see p.20, last para., cls.19 and 30, Art.33.2 PCT). The use of photonic crystal fibres in telecommunication systems or networks moreover appears to be a straightforward selection when taking into consideration the purpose of the fibres, i.e. establishing a single-mode low loss fibre link.

Claim 16 refers to a sensor, however, sensor applications for "hollow" fibres are well-known in the art (Art.33.3 PCT).

Method claim 20 defines the normal way of producing photonic crystal fibres (see D1, p.17, 1st and 2nd para.). The provision of some sort of appropriate "spacer" (=truncated cane) in order to establish a central cavity appears to be a straight-forward application of normal laboratory skills when aiming at the provision of a central "defect site" in the form of the desired "large" hole (Art.33.2 PCT, claims 22 and 23).

The use of capillaries and triangular arrays thereof forms part of the state of the art, as well as their filling with air or materials other than air (see D1, passages already cited, claims 24 to 26).

As regards claims 21, 27 to 30, see section III

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/GB00/01249

Concerning **section VI**:

Certain published documents (Rule 70.10)

Application No  
Patent No                      Publication date  
(day/month/year) Filing date  
(day/month/year) Priority date (valid claim)  
(day/month/year)

WO 9964903 A	16.12.1999	21.05.1999	09.06.1998
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The above cited document may be relevant for assessing novelty of all claims in subsequent national procedures.

Concerning **section VII**:

The features of claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Independent claims 1 and 18 are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D2 are not mentioned in the description, nor are these documents identified therein.

Concerning **section VIII**:

1. The expression "longer than a single, shortest, period of the cladding" is vague and thus interpreted as referring to the shortest distance of the holes of the periodic arrangement (pitch).

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/GB00/01249

2. Claim 10 refers to the intended result "support at least one transverse mode" but not the respective features, which apparently are related to the core and cladding arrangement. When taking into account the complete application, it appears that claim 10 is directed to the same fibre as claim 1 and thus, a lack of conciseness occurs, too.